

The documentation and process conversion measures necessary to comply with this amendment shall be completed by 7 November 2000.

INCH-POUND

MIL-PRF-19500/301D
AMENDMENT 2
7 August 2000
SUPERSEDING
AMENDMENT 1
15 April 2000

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN SILICON, LOW-POWER
TYPE 2N918
JAN, JANTX, JANTXV AND JANS

This amendment forms a part of MIL-PRF-19500/301D, dated 4 August 1999, and is approved for use by all Departments and Agencies of the Department of Defense.

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* 1.3, delete and substitute as follows:

"1.3 Maximum ratings.

Types	P_T <u>1/</u> $T_A = +25^\circ\text{C}$	V_{CBO}	V_{CEO}	V_{EBO}	I_C	T_{STG} and T_J	$R_{\theta JA}$
	<u>mW</u>	<u>V dc</u>	<u>V dc</u>	<u>V dc</u>	<u>mA dc</u>	<u>°C</u>	<u>°C</u>
2N918	500	30	15	3.0	50	-65 to +200	325

1/ Derate linearly, 3.08 mW/°C above $T_A = +37.5^\circ\text{C}$. "

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FIGURE 1, dimension table; delete and substitute:

Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	0.178	0.195	4.52	4.95	
CH	0.170	0.210	4.32	5.33	
HD	0.209	0.230	5.31	5.84	
LC	0.100 TP		2.54 TP		
LD	0.016	0.021	0.41	0.53	2,5
LL	0.500	0.750	12.70	19.05	5
LU	0.016	0.019	0.41	0.48	3,5
L ₁		0.050		1.27	
L ₂	0.250		6.35		
TL	0.028	0.048	0.71	1.22	7
TW	0.036	0.046	0.91	1.17	
P	0.100		2.54		
Q		0.040		1.02	
r		0.007		0.18	
α	45° TP				

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* 4.3.1, delete and substitute as follows:

“4.3.1 Power burn-in conditions. Power burn-in conditions are as follows:

V_{CB} = 10 - 30 V dc. Power shall be applied to achieve T_J = 135°C minimum and a minimum P_D = 75 percent of P_T maximum rated as defined in 1.3 herein.”

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*4.4.2.1, delete and substitute as follows:

“ 4.4.2.1 Group B inspection, table VIa (JANS) of MIL-PRF-19500.

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
B3	2037	Test condition A. All internal leads for each device shall be pulled separately.
B4	1037	$V_{CB} = 10 \text{ V dc}$.
B5	1027	$V_{CB} = 10 \text{ V dc}$; $T_A = 125^\circ\text{C} \pm 25^\circ\text{C}$ for 96 hours, with P_T adjusted as required by the chosen T_A to give $T_J = 275^\circ\text{C}$ minimum. Optionally this test may be performed for a minimum of 216 hours with P_T adjusted to achieve a $T_J = 225^\circ\text{C}$ minimum. Sample size = 45, $c = 0$. (Note: If A failure occurs, resubmission shall be at the test conditions of the original sample.)”

* 4.4.2.2, delete and substitute as follows:

“ 4.4.2.2 Group B inspection, table VIb (JAN, JANTX and JANTXV). Separate samples may be used for each step. In the event of a group B failure, the manufacturer may pull a new sample at double size from either the failed assembly lot or from another assembly lot from the same wafer lot. If the new “assembly lot” option is exercised, the failed assembly lot shall be scrapped.

Step	Method	Conditions
1	1027	Steady state life: test condition B, 340 hours, $V_{CB} = 10 - 30 \text{ V dc}$; Power shall be applied to achieve $T_J = 150^\circ\text{C}$ minimum and a power dissipation of $P_D = 75$ percent of max rated P_T as defined in 1.3. $n = 45$ devices, $c = 0$. For small lots, $n = 12$ devices, $c = 0$
2	1027	The steady state life test of step 1 shall be extended to 1,000 hours for each die design. Samples shall be selected from a wafer lot every twelve months of wafer production. Group B step 2 shall not be required more than once for any single wafer lot. $n = 45$, $c = 0$.
3	1032	High temperature life (non operating), $t = 340$ hours, ; $T_A = +200^\circ\text{C}$. $n = 22$, $c = 0$. “

* Add the following new paragraph:

“ 4.4.2.3 Group B sample selection. Samples selected from group B inspection shall meet all of the following requirements:

- For JAN, JANTX and JANTXV samples shall be selected randomly from a minimum of three wafers (or from each wafer in the lot) from each wafer lot. For JANS samples shall be selected from each inspection lot. See MIL-PRF-19500.
- Must be chosen from an inspection lot that has been submitted to and passed group A, subgroup 2 conformance inspection. When the final lead finish is solder or any plating prone to oxidation at high temperature, the samples for life test (subgroups B4 and B5 for JANS, and group B for JAN, JANTX and JANTXV) may be pulled prior to the application of final lead finish. “

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* 4.4.3, delete and substitute as follows:

“4.4.3 Group C inspection, Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table VII of MIL-PRF-19500, and in 4.4.3.1 (JANS).and 4.4.3.2 (JAN, JANTX, and JANTXV) herein for group C testing. Electrical measurements (end points) and delta requirements shall be in accordance with group A, subgroup 2 and table II herein.

4.4.3.1 Group C inspection, table VII of MIL-PRF-19500.

Subgroup	Method	Conditions
C2	2036	Test condition E.
C6	1026	$V_{CB} = 10$ V dc, 1,000 hours; power shall be applied to achieve $T_J = +150^\circ\text{C}$ minimum and a power dissipation of $P_D = 75$ percent of max rated P_T as defined in 1.3. $N = 45$ devices, $c = 0$. For small lots, $n = 12$ devices, $c = 0$.”

* Add the following new paragraph:

“ 4.4.3.3 Group C sample selection. Samples for subgroups in group C shall be chosen at random from any inspection lot containing the intended package type and lead finish procured to the same specification which is submitted to and passes group A tests for conformance inspection. Testing of a subgroup using a single device type enclosed in the intended package type shall be considered as complying with the requirements for that subgroup.”

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* Table I, subgroup 4, Oscillator power output, min. limits column; add “30”; max. limits column; delete “30”.

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* Table II; delete and substitute as follows:

“TABLE II. Groups B and C delta electrical measurements. 1/ 2/

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Collector-base cutoff current	3036	Bias condition D; $V_{CB} = 25$ V dc	ΔI_{CBO1} 3/	100 percent of initial value or 5 nA dc, whichever is greater. ± 25 percent change from initial reading ± 50 mV dc change from previously measured value.		
2.	Forward-current transfer ratio	3076	$V_{CE} = 1.0$ V dc; $I_C = 3.0$ mA dc	Δh_{FE2} 3/			
3.	Collector-emitter voltage (saturated)	3071	$I_C = 10$ mA dc; $I_B = 1.0$ mA dc	$\Delta V_{CE(sat)}$ 3/			

1/ The delta electrical measurements for table VIa (JANS) of MIL-PRF-19500 are as follows:

- Subgroup 4, see table II herein, step 3.
- Subgroup 5, see table II herein, steps 1, 2 and 3.

2/ The delta electrical measurements for table VII of MIL-PRF-19500 are as follows:

- Subgroup 6, see table II herein, steps 1, 2 and 3 for JANS level.

3/ Devices which exceed the group A limits for this test shall not be acceptable.”

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The margins of this amendment are marked with an asterisk to indicate where changes from the previous amendment were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous amendment.

Custodians:

Army - CR
Navy - EC
Air Force - 11
NASA – NA
DLA - CC

Preparing activity:

DLA - CC

(Project 5961-2321)

Review activities:

Army - AR, MI
Navy - AS, CG, MC, SH
Air Force - 19